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THE CONSUMPTION AND RATIONING OF MEAT AND CHEESE

By R. S. G. *and* M. E. E. RUTHERFORD

1. In the third number of the *Oxford Economic Papers*—February 1940—attention was drawn to the need for a detailed knowledge of the frequency distribution of consumption of any commodity in order to determine that ration which will clear the available supplies. It was shown that the crude (and easiest) method of fixing a ration, by dividing total supplies available by the total number of persons to be fed, would lead to waste. A certain proportion of the population would never consume the full ration whether in peace or war, either because they could not afford to do so, or because they were not in the habit of eating that particular food. Therefore, considerably higher rations could be established than the crude average.

In that article, from material gathered in the Oxford Agricultural Economics Research Institute's survey of the consumption of milk and milk products which was conducted in May and June 1938, it was shown how these principles applied to butter and margarine rationing. The same survey also collected information on the expenditure in bulk on other foodstuffs. The purpose of this article is to discuss, from the same point of view, the data on the animal protein sources, i.e. meat and cheese, from that survey; and to consider the effects on consumption of various ration levels. The information on meat consumption is less reliable than that on milk products. Therefore, it has been impossible to extract the results for the whole 37,000 people considered in the previous article. The first one hundred cards from each town giving full information have been used. The sample may not, therefore, be fully representative of the towns as a whole: it does, however, cover some 5,546 people or 1,600 households scattered over England and Wales, and may be regarded as more or less representative of the country as a whole.

The distribution of Weekly Food Expenditure per head is given in Fig. 1 (see also Table II).

2. **Meat.** At the outset it is necessary to make plain exactly what this wide term —'meat'—really represents. From internal evidence

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on the cards it would appear to include beef, veal, mutton, lamb, pork, 'offals' and poultry—in other words, those animal products normally bought from the butcher. Bacon, ham, corned beef, sausages and the like are generally returned as 'groceries'. This, therefore, is the interpretation of 'meat' to be used in this article.[1]

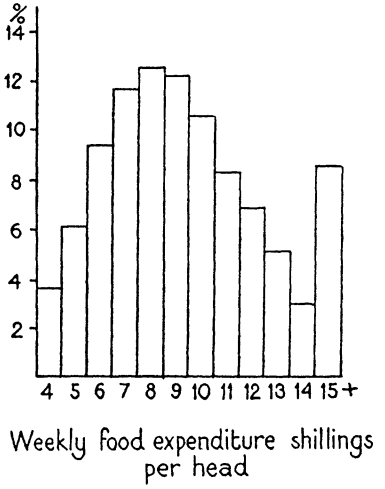

FIG. 1. Distribution of weekly food expenditure per head in sample

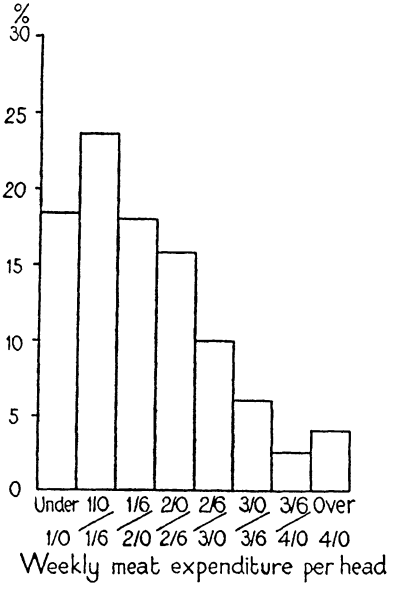

FIG. 2. Distribution of weekly meat expenditure per head in sample

The consumption of meat per head per week over 1600 households[2] is distributed as shown in Fig. 2 (see also Table II). The relatively high proportion of persons consuming relatively little meat is of considerable interest—particularly as it obviously cannot be explained by an undue preponderance of poorer people. The average weekly food expenditure on meat is as low as 22·236 pence per head.[3]

More than $\frac{1}{6}$ of the people studied consume less than 1*s.* worth of meat. Another 24 per cent spend between 1*s.* and 1*s.* 6*d.* per

[1] See Section (5).

[2] Reduced in Table II to a population of 1,000 persons.

[3] It must be remembered that this is 'meat' in our sense, i.e. including pork, offals, and poultry. The original ration of 22*d.* did not, of course, cover these items, and therefore appears to have been higher than the average peace-time consumption and very generous.

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head per week. Yet at the other end of the scale there is a considerable proportion of persons buying over 4*s*. worth of meat per week, a fair proportion of which is poultry.

The importance of the people consuming small amounts of meat is clearly brought out in Fig. 3 and Table I.

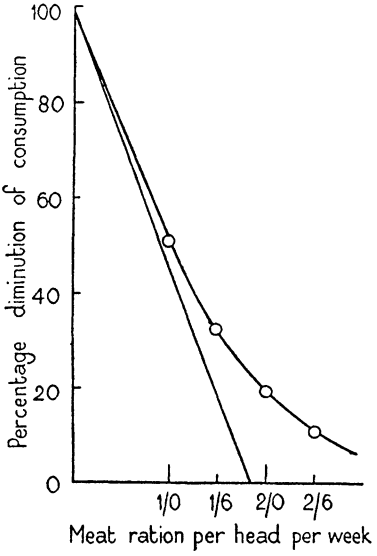

FIG. 3. The effect of rationing on meat consumption

TABLE I

Ration per head per week	*Percentage Diminution of Consumption*	*Crude Meat Ration per head per week*
1/–	51·3	10·8*d*.
1/6	32·7	15·0*d*.
2/–	19·8	17·8*d*.
2/6	11·4	19·7*d*.

These show the effect on total consumption of various ration levels, and, conversely, the ration levels called for by any given percentage diminution of available supplies. Thus, if meat supplies are 20 per cent less than in peace-time, a ration of just under 2*s*. per head will be possible on our method, but only 1*s*. 5*d*. on the crude method. It should be noted that if supplies are very much restricted there is very little difference between the two rations. This is found with any commodity, but the rate of divergence

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between the two types of rations is greater with meat than with butter.

3. The question naturally arises—'Whose consumption will be restricted by such rations?' The answer to this is also the reply to

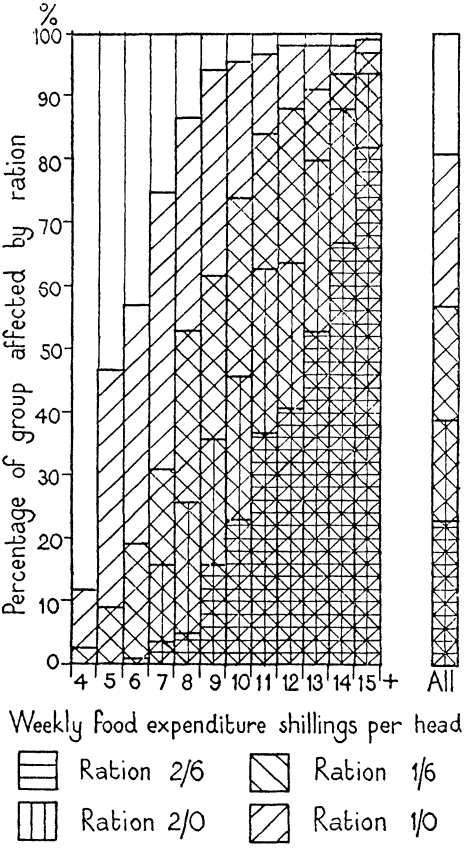

FIG. 4. The effect on the consumption of meat of various ration levels at each level of food expenditure

the suggestion that, if the distribution into the food expenditure groups of the sample is not the same as that of the population as a whole, then these results are not those which will, in actual fact, occur. It is only necessary to show the effects on each food expenditure group of the various ration levels. This is done in Tables II and III and in Fig. 4.

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TABLE II

Meat Expenditure in Relation to Food Expenditure per head per week
Reduced to a total population of 1,000

Food Group centred on	*Meat*								*Total*
	Under 1/-	*1/- to 1/6*	*1/6 to 2/-*	*2/- to 2/6*	*2/6 to 3/-*	*3/- to 3/6*	*3/6 to 4/-*	*Over 3/-*	
4/-	49	5	1	1	—	—	—	—	56
5/-	32	23	6	—	—	—	—	—	61
6/-	40	17	17	1	—	—	—	—	94
7/-	29	51	18	14	5	—	—	—	117
8/-	17	42	33	28	3	1	1	—	125
9/-	7	39	32	25	14	5	—	—	122
10/-	5	22	30	24	18	6	1	—	106
11/-	3	11	17	22	18	8	3	1	83
12/-	2	7	17	15	11	8	5	4	69
13/-	1	2	6	14	14	6	5	3	51
14/-	—	1	2	6	6	4	5	6	30
15/-	—	1	1	6	5	8	2	4	27
16/-	1	1	1	2	2	5	2	8	17
17/-	—	—	1	1	1	1	1	2	7
18/-	—	—	—	1	3	3	—	7	14
19/-	—	—	—	—	—	—	—	3	3
20/-	—	—	—	—	1	2	2	4	9
Over 20/-	—	—	—	—	—	1	1	7	99
	186	241	182	160	101	58	28	44	1,000

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TABLE III

Percentages of each Food Expenditure Group whose Consumption is Restricted by Various Meat Rations

Group centred on	*Meat Ration*				*Weight in Sample*
	1/–	*1/6*	*2/–*	*2/6*	
4/–	12	3	—	—	56
5/–	47	9	—	—	61
6/–	57	19	1	—	94
7/–	75	31	16	4	117
8/–	87	53	26	5	125
9/–	94	62	36	16	122
10/–	95	74	46	23	106
11/–	97	84	63	37	83
12/–	98	88	64	41	69
13/–	98	91	80	53	51
14/–	98	94	88	67	30
Over 15/–[1]	99	97	94	82	86
ALL	81	57	39	23	1,000

[1] Centred on 17·55.

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Table II shows the connexion between meat expenditure per head and total food expenditure per head. For the reader's convenience, the sample of 5,546 has been reduced to a population of 1000. Table III, derived from Table II, shows the percentage of the total in each food expenditure group which consumes more than 1*s*., 1*s*. 6*d*., 2*s*. and 2*s*. 6*d*. worth of meat per week respectively. Thus 12 per

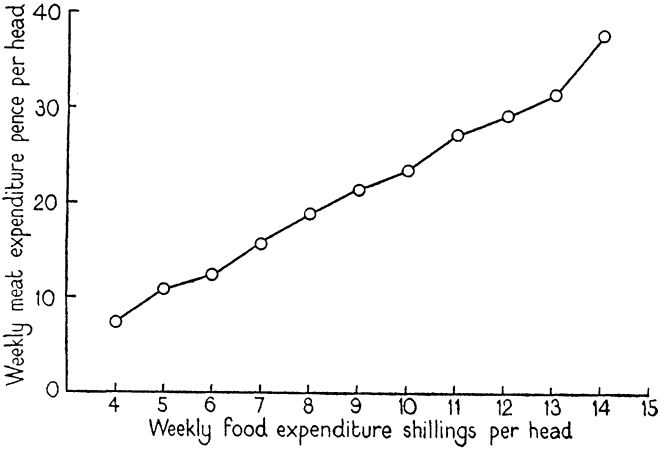

FIG. 5. Expenditure on meat and on total food

cent of the group spending only 4*s*. per week on *all* foods spend more than 1*s*. on meat: 3 per cent spend more than 1*s*. 6*d*. each: 1 per cent more than 2*s*., and so on. Also, any column will show that a ration of, say, 2*s*. will restrict 1 per cent of the under 5*s*. group, 46 per cent of the 6*s*. group, and 94 per cent of those spending more than 15*s*. a week on food. Of the sample as a whole, 81 per cent will be restricted by a ration of 1*s*., 57 per cent by a ration of 1*s*. 6*d*., 39 per cent by a ration of 2*s*. and 23 per cent by a ration of 2*s*. 6*d*. Fig. 4 shows these results diagrammatically.

The objection that the sample is not representative of the food expenditure distribution of the population remains. Corrected figures for Table I may be obtained by giving each row any other weighting which is suggested as correct. It is, of course, assumed that within each food expenditure group the distribution of meat expenditure is correctly given by the sample. This seems quite justified.

4. Inspection of Tables II and III brings out very clearly that

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expenditure on meat is very closely linked to the total funds available for expenditure on foods as a whole. This is shown more explicitly by Table IV and Fig. 5, which show the average meat consumption of each food expenditure group.

TABLE IV

Food Expenditure Shillings per week per person	*Meat Expenditure Pence per week per person*	*Food Expenditure Shillings per week per person*	*Meat Expenditure Pence per week per person*
4	7·36	10	23·52
5	10·84	11	27·28
6	12·39	12	29·46
7	15·83	13	31·71
8	18·81	14	37·90
9	21·61	15 & over	43·20

A clear linear relation can be seen between meat and food expenditures. Of every shilling more spent on food as a whole, about 3*d.* is devoted to meat. This suggests that, whatever the initial level of food expenditure, the appetite for meat is far from being appeased within the food expenditure ranges of which we have reliable evidence.

5. Sir John Orr has provided figures with which these may readily be compared (*Food, Health and Income*, Table III, Appendix VI, p. 67).

TABLE V

Sir John Orr's Figures

Average Food Expenditure per week		*4s.*	*6s.*	*8s.*	*10s.*	*12s.*	*14s.*
Expenditure on	(*pence*)						
Beef and Veal .	,,	4·7	7·1	9·8	12·0	14·5	15·4
Mutton and Lamb	,,	1·7	3·1	5·0	7·1	9·2	11·0
Total	,,	6·4	10·2	14·8	19·1	23·7	26·4
Our figures . .	,,	7·4	12·4	18·8	23·5	29·5	37·9

The two sets of figures show much the same increase as one moves

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from one food expenditure level to another. But our estimates exceed Orr's by amounts varying from 1*d.* to just under 1*s.* in the extreme groups, although they remain fairly constant at about 4*d.* in the middle groups. This discrepancy is largely accounted for by the fact that our figures include poultry and pork. Poultry certainly does not become important until the higher levels of food expenditure are reached. This will explain the greater difference in the 14*s.* group. If allowance be made for the fact that Orr's figures for beef, veal, mutton and lamb, seem to include what is known as 'offals', *then only some* 80 *per cent of what has been called 'meat' in this analysis was subject to rationing under the original arrangements.*

Because of this, Table I has been reconstructed to show the effects upon consumption of various rations with the former interpretation of the term 'rationed meat'.

TABLE VI

Ration Per head per week	*Percentage Diminution of Consumption of Rationed Meats*
9·6	51·3
14·4	32·7
19·2	19·8
24·0	11·4

In interpreting these results, it must be remembered always that a reduction in the consumption of rationed meats will be accompanied by a rise in the demand for unrationed meat. This may not be of great importance as far as offals are concerned, unless it leads to the use of parts of the animal not previously in general consumption, for a shortage of available supplies of beef or mutton must mean a shortage of 'offals' derived therefrom. There also seems no great opportunity for increased supply of pork and poultry, particularly in view of the present feeding-stuffs policy.

The meat ration of 22*d.* worth per head per week seems likely to have produced only some 15 per cent reduction in consumption, and would, therefore, seem to have been on a very generous scale. 22*d.* of 'rationed meat' is equivalent to 27·5*d.* of 'meat'. Therefore it can be estimated from Table III that only 32 per cent of the population as a whole had to cut down their meat consumption;

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that, of people with a food expenditure of less than 9*s*., the proportion was well under 25 per cent; and that it rises to as much as 90 per cent of the very wealthy. The small reduction in total consumption seems to suggest that the problem before the Ministry of Food was not solely, or even mainly, one of the fair distribution of very much

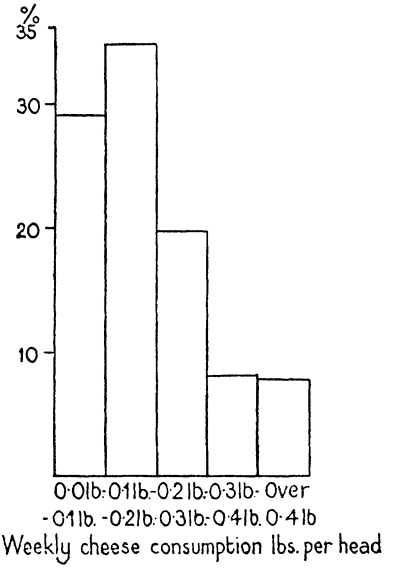

FIG. 6. Distribution of weekly cheese consumption per head

curtailed supplies. It was probably rather one of ensuring the appropriate division of supplies among retailers so that no one district was temporarily short.[1]

6. **Cheese.** Cheese consumption is given in pounds consumed—not amount spent. The sample is the same as that used for meat. The Food Expenditure distribution is therefore the same as in Fig. I. The distribution of cheese consumption per head per week is shown in Fig. 6 (see also Table VIII). Clearly a majority of people consumed under 0·2 lbs. per head per week. The effect upon cheese consumption of various rations is shown in Fig. 7 and Table VII. Tables VIII,

[1] Price changes have been neglected. If prices have risen considerably, then still further deflation is required.

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IX, and X present results for cheese corresponding to Tables II, III, and IV for meat.

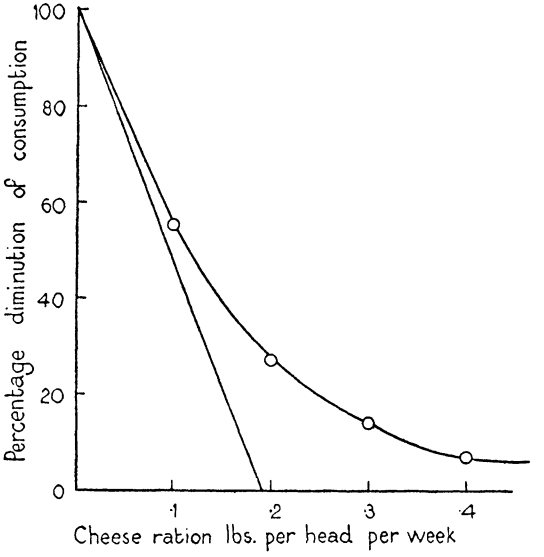

FIG. 7. The effect of rationing on cheese consumption

It is apparent that there is a difference in the general character of Tables VIII, IX, X, and II, III, IV respectively. On the whole, cheese consumption rises with rising food expenditure, but not regularly—e.g. when food expenditure rises from 6*s*. to 7*s*., cheese consumption actually falls. A similar reaction can be observed between 11*s*. and 12*s*. and between 14*s*. and 15*s*. This is also reflected in Table IX, which shows that, at any ration level, fewer consumers in the 7*s*. group are affected than in the 6*s*. group.

TABLE VII

Ration *Pounds per head per week*	*Percentage Diminution of Consumption*
0·1	55·4
0·2	27·5
0·3	13·9
0·4	6·7

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TABLE VIII

Cheese Consumption in Relation to Food Expenditure per head per week Reduced to a Total Population of 1,000

Food Shillings	Cheese (lbs.)					Total	Food Shillings	Cheese (lbs.)					Total
	Under ·1	·1–·2	·2–·3	·3–·4	Over ·4			Under ·1	·1–·2	·2–·3	·3–·4	Over ·4	
4	26	20	8	1	1	56	15	7	7	6	2	2	27
5	22	28	5	3	3	61	16	4	3	5	3	—	17
6	32	34	14	8	5	94	17	2	2	1	1	1	7
7	40	47	20	5	9	117	18	3	4	5	1	—	14
8	36	49	21	10	11	125	19	1	—	1	1	—	3
9	34	44	24	9	6	122	20	2	2	3	1	1	9
10	25	35	27	13	7	106	over						
11	18	28	23	7	7	83	20	2	1	2	1	—	9
12	21	22	13	6	6	69							
13	13	15	11	6	5	51							
14	4	8	10	3	5	30	TOTAL	292	349	199	81	79	1,000

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TABLE IX

Percentage of each Food Expenditure Group whose Consumption is Restricted by Various Cheese Rations

Group centred on	*Cheese Ration*				*Weight in Sample*
	·1 lbs.	*·2 lbs.*	*·3 lbs.*	*·4 lbs.*	
4/–	54	18	4	2	56
5/–	64	18	10	5	61
6/–	66	30	15	6	94
7/–	66	26	8	4	117
8/–	71	32	15	7	125
9/–	72	36	16	9	122
10/–	76	43	18	6	106
11/–	78	44	17	8	83
12/–	70	38	19	10	69
13/–	75	45	24	12	51
14/–	87	60	27	17	30
15/– and over[1]	76	53	27	15	86
ALL	71	36	16	8	1,000

[1] Centred on 17·55 shillings.

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TABLE X

Food Expenditure Shillings	*Cheese Consumption Pounds*	*Food Expenditure Shillings*	*Cheese Consumption Pounds*
4	·133	10	·197
5	·152	11	·208
6	·171	12	·196
7	·158	13	·241
8	·179	14	·264
9	·196	15 & over	·252
		Average 9·404	·191

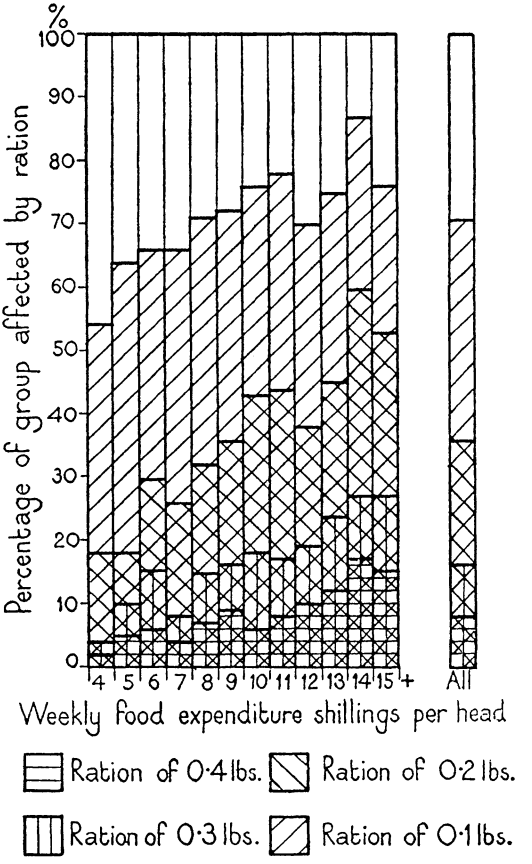

FIG. 8. The effect on the consumption of cheese, at each level of food expenditure of various ration levels

The relation between food expenditure and cheese consumption is not, therefore, a very clear one. Orr's figures relating to cheese

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consumption show a definite downward trend of consumption after food expenditure reaches 12*s.* a head. This is not shown by the present results, but there is evidence of such reduction in the individual results for the towns in the sample. The peaks, however, are at different food expenditure levels. Their varying position hides

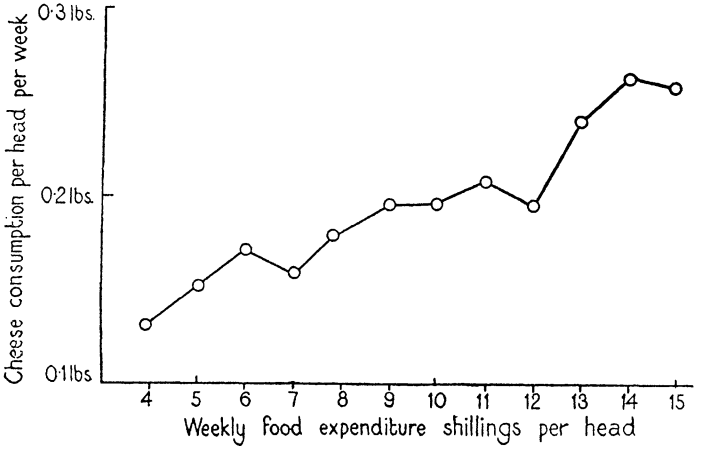

FIG. 9. Expenditure and cheese consumption

the tendency in the aggregate curves. The explanation of this tendency is that in the higher income ranges the cheese consumed is of a 'fancy' nature, e.g. Camembert or Stilton. These cheeses are luxuries and not a staple part of the diet. Therefore, comparatively little is consumed. The essential food value which encourages cheese consumption by poorer people is met by other foodstuffs.

7. Substitution between Meat and Cheese

Despite exhaustive analyses, no evidence is available of any conscious substitution of cheese for meat. When meat consumption is higher than food expenditure warrants, cheese consumption is more often higher than lower. Nor is there any clear evidence of this greater animal protein intake being related to the occupation of the wage-earners in the family, or to the family constitution. This suggests very firmly that much propaganda would be needed to produce any voluntary shift from the one source of animal proteins to the other according to the dictates of any suggested food policy.

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